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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,452	01/28/2005	Atsushi Kikuchi	450100-05086	1151

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EXAMINER

RIZK, SAMIR WADIE

ART UNIT	PAPER NUMBER
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2112

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01/06/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/523,452	Applicant(s) KIKUCHI ET AL.	
	Examiner SAM RIZK	Art Unit 2112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 14-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-8, 11, 12 and 14-16 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 9 and 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

- Response to the applicant's amendment dated 9/17/2008
- Claims 13 and 17-32 have been Cancelled
- Claims 1-12 and 14-16 have been submitted for examination
- Claims 1-3,6-8, 11, 12 and 14-16 have been rejected
- Claims 4, 5, 9 and 10 are objected to

Drawings Objections

1. In view of the applicant amended drawings filed on 9/17/2008, all objections to the drawings are withdrawn.

Specification

2. In view of the applicant-amended title, all objections to the specification are withdrawn.
3. The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code, See page 9, (lines 22-24). Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP § 608.01.

Claim Rejections - 35 USC § 101

4. In view of the applicant amended claim 16 cancelled claim 13, all objections to the claim rejections under section **35 USC § 101** are withdrawn.

Claim Objections

5. In view of the applicant amended claim(s) to recite logic one as “1” , all objections to the claim(s) are withdrawn.
6. Claim 11, line 5 should correct typo to read: “convolutionally”

Response to Arguments

7. Applicant’s arguments, see pages 11 and 12, filed on 9/17/2008, with respect to the rejection(s) of claim(s) under section 35 USC 102(e) have been fully considered and are persuasive. The Examiner acknowledges that Matsumoto is not prior art over the instant application, therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of De Souza et al. US patent no. 6789227 (Hereinafter De Souza).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
8. Claims 1, 6, 11, 12 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Souza et al. US patent no. 6789227 (Hereinafter De Souza) and further in view of Coker et al. US publication no. 2003/ 0074626 (Hereinafter Coker).

9. In regard to claim 1, De Souza teaches:

- (Currently Amended) A method for decoding a linear code the method comprising:
 - reducing a density of a check matrix of the linear code by reducing a density of elements included in the check matrix and having values that are determined to be one "1", and
- (col. 5, lines (1-15) and lines (40-45) in De Souza)

However, De Souza does teach:

- decoding the linear code through a sum product algorithm by using the check matrix whose density has been reduced

Coker in an analogous art that teaches decoding LDPC using SPA teaches:

- decoding the linear code through a sum product algorithm by using the check matrix whose density has been reduced
- (section [0045] in Coker)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Coker that comprise decoding

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linear code using SPA with the teaching of De Souza.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the need for implanting SPA decoding with efficient check matrix generator.

10. Claim 6 is rejected for the same reasons as per claim 1.

11. In regard to claim 11, Coker teaches:

- (Currently Amended) The decoder according to claim 6, further including means for performing soft-decision decoding on a linear code subjected to convolutional encoding, wherein the means for reducing reduces the density of a check matrix obtained by decoding the convolutionally encoded linear code, the reduction being performed by reducing a density of [[the]] elements included in the obtained check matrix and having values that are determined to be one "1",

(section [0049] in Coker)

12. In regard to claim 12, Coker teaches:

- (Currently Amended) The decoder according to claim 11, wherein the soft-decision decoding the low-density processing and the decoding the are repetitively performed.

(section [0049] in Coker)

13. Claim 14 is rejected for the same reasons as per claim 1.

14. Claim 15 is rejected for the same reasons as per claim 1.

15. Claim 16 is rejected for the same reasons as per claim 1.

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16. Claims 2, 3, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Souza and further in view of Coker and in further view of Solomon US patent no. 3818442 (Hereinafter Solomon).

17. In regard to claim 2, De Souza/Coker teach substantially all the limitations in claim 1.

However, De Souza/Coker does not teach:

- (Currently Amended) The decoding method according to claim 1, that wherein the linear code is a finite field including powers of prime numbers, as elements. Solomon in an analogous art that teaches error correcting decoder for group (linear) codes teaches:
- (Currently Amended) The decoding method according to claim 1, that wherein the linear code is a finite field including powers of prime numbers, as elements. (col. 4, lines (20-40) in Solomon)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Solomon that comprise decoding linear code with the teaching of De Souza/Coker.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the need for decoding linear code over algebraic finite field.

18. In regard to claim 3, Solomon teaches:

- (Currently Amended) The decoding method according to claim 2, that wherein the linear code includes a BCH code, or a Reed-Solomon code on the finite field.

(Col. 5, lines (25-45) in Solomon)

- 19. claim 7 is rejected for the same reasons as per claim 2.
- 20. claim 8 is rejected for the same reasons as per claim 3.

Allowable Subject Matter

- 21. Claims 4, 5 , 9 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Allowance

The following is an examiner's statement of reasons for allowance:

- 22. Claim 4 of the present application teaches, for example, The decoding method according to claim 1, that wherein reducing the density includes calculating a linear combination of rows of the check matrix; extracting a subset of lower-weight vectors for forming a complementary space from among a vector set obtained by the linear combination; and generating a new check matrix by including all the vectors of the vector subset as row elements of the new check matrix.

The foregoing limitations are not found in the prior art of record.

Particularly, none of the prior arts of record teach nor fairly suggest,
calculating a linear combination of rows of the check matrix; extracting a subset of lower-weight vectors for forming a complementary space from among a vector

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set obtained by the linear combination; and generating a new check matrix by including all the vectors of the vector subset as row elements of the new check matrix.

- 23. Claim 5 depend from claim 4.
- 24. Claim 9 is allowed for the same reasons as per claim 4.
- 25. Claim 10 depend from claim 9.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Rizk whose telephone number is (571) 272-8191. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacques Louis-Jacques can be reached on (571) 272-6962. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronics Business Center (EBC) at 866-217-9197 (toll-free).

/Sam Rizk/

Examiner, Art Unit 2112